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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Witzgall — Docket No.: TI-23879

Serial No.: 09/469,070 — Art Unit: 2674

Filed: 12/21/1999 — Examiner: Abdulselam, A.

For: ELECTRO-OPTICAL, TUNABLE, BROADBAND COLOR MODULATOR

APPEAL BRIEF TRANSMITTAL

November 13, 2002

Assistant Commissioner for Patents
Washington, D. C. 20231

MAILING CERTIFICATE UNDER 37 C.F.R. •1.8(A)
I hereby certify that the above correspondence is being deposited with the U.S. Postal Service as First Class Mail in an envelope addressed to: Assistant Commissioner For Patents, Washington, D.C. 20231 on the date below.

Sue Short — 11/13/02
Sue Short — Date

Sir:

Transmitted herewith in triplicate is an Appeal Brief in the above-identified application.

Please charge the $320.00 fee for filing the Brief to the deposit account of Texas Instruments Incorporated, Account No. 20-0668.

Charge any additional fees, or credit overpayment to Deposit Account No. 20-0668. Three copies of this sheet are enclosed.

Respectfully submitted,

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Witzgall

Art Unit: 2674

Serial No.: 09/469,070

Examiner: Abdulselam, A.

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Docket No.: TI-23879

For: ELECTRO-OPTICAL, TUNABLE, BROADBAND COLOR MODULATOR

APPEAL BRIEF UNDER 37 C.F.R. § 1.192

November 12, 2002

Assistant Commissioner for Patents
Washington, D.C. 20231

MAILING CERTIFICATE UNDER 37 C.F.R. 31.8(A)
I hereby certify that the above correspondence is being deposited with the U.S. Postal Service as First Class Mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231 on the date shown below.

Sue Short — Date 11/13/02

Dear Sir:

The following Appeal Brief is respectfully submitted, in triplicate, in connection with the above-identified application in response to the Final Rejection mailed May 6, 2002, and the Advisory Action mailed August 12, 2002. Please charge all required fees to the deposit account of Texas Instruments Incorporated, deposit account no. 20-0668.

REAL PARTY IN INTEREST

The real party in interest is Texas Instruments Incorporated, to whom this application is assigned.

RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences known to the Applicant's legal representative.

STATUS OF THE CLAIMS

This application was originally filed with ten claims, three of which were in independent form. No claims have been allowed. Claims 1-10 are pending and stand rejected.

STATUS OF THE AMENDMENTS

Claim 10 was amended on 21 February 2002. A response to the final rejection did not amend any of the claims. A response to the final rejection was submitted on 12 July 2002, but did not propose amendments to the claims.

SUMMARY OF THE INVENTION

Lines 5-9 and 14-19 of page 3 of the specification provide a concise explanation of the invention defined in the appealed claims, which recite a color modulator, a display system using a color modulator, and a method of creating full-color images. The color modulator is comprised of a stack of dielectric layers and transparent electrodes. A voltage applied to the electrodes filters incident white light, allowing wavelengths in a given passband—a beam of colored light—to pass through the color modulator. Line 4 of page 8, through line 4 of page 10 of the specification further describe the operation of the color modulator. The voltage applied to the electrodes alters the electric field that the electro-optical material is exposed to. The electric field determines the index of refraction of the material. The index of refraction of each layer determines the passband of the dichroic filter. As described in line 12 of page 10 through line 16 of page 12, color filters are built up of several layers of the electro-optical material and transparent electrodes. As with dichroic filters, the thickness of the layer and the index of refraction of the layer combine to control what wavelengths are allowed to pass through the layer

and which wavelengths are reflected by the layer. Thus, wavelengths of a given color band can be allowed to pass to create a colored light beam.

ISSUES

1. Whether Claims 1-6 are unpatentable under 35 U.S.C. § 103 (a) over U.S. Patent No. 5,486,878 to Negishi et al. ("Negishi").
2. Whether Claims 7-9 are unpatentable under 35 U.S.C. § 103 (a) over Negishi.
3. Whether Claim 10 is unpatentable under 35 U.S.C. § 103 (a) over Negishi.

GROUPING OF THE CLAIMS

Claims 1, 7, and 10 are independently patentable and stand or fall individually for the reasons more clearly set forth hereinbelow. Claims 2-6 stand or fall together with Claim 1, from which Claims 2-6 depend. Claims 8-9 stand or fall together with Claim 7, from which Claims 8-9 depend.

ARGUMENTS

Issue 1:

Claim 1 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Negishi. The applicant respectfully disagrees and submits the Examiner has failed to present a prima facie case of obviousness under 35 U.S.C. § 103.

"A person shall be entitled to a patent unless," creates an initial presumption of patentability in favor of the applicant. 35 U.S.C. § 102. "We think the precise language of 35 U.S.C. § 102 that, 'a person shall be entitled to a patent unless,' concerning novelty and unobviousness, clearly places a burden of proof on the Patent Office which requires it to produce the factual basis for its rejection of an application under sections 102 and

103, see Graham and Adams." *In re Warner*, 379 F.2d 1011, 1016 (C.C.P.A. 1967) (referencing *Graham v. John Deere Co.*, 383 U.S. 1 (1966) and *United States v. Adams*, 383 U.S. 39 (1966)). "As adapted to *ex parte* procedure, *Graham* is interpreted as continuing to place the 'burden of proof on the Patent Office which requires it to produce the factual basis for its rejection of an application under sections 102 and 103'." *In re Piasecki*, 745 F.2d 1468 (Fed. Cir. 1984) (citing *In re Warner*, 379 F.2d at 1016).

"The prima facie case is a procedural tool which, as used in patent examination (as by courts in general), means not only that the evidence of the prior art would reasonably allow the conclusion the examiner seeks, but also that the prior art compels such a conclusion if the applicant produces no evidence or argument to rebut it." In re Spada, 911 F.2d 705, 708 n.3 (Fed. Cir. 1990).

"To support the conclusion that the claimed combination is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed combination or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references." Ex parte Clapp, 227 U.S.P.Q. 972, 973 (Bd. Pat. App. & Inter. 1985).

"To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). 'All words in a claim must be considered in judging the patentability of that claim against the prior art.' In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970)." MPEP § 2143.03.

The Examiner has not pointed to any teaching in Negishi that suggests a "color modulator comprised of a stack of at least two dielectric layers and at least three transparent electrodes, wherein a voltage applied to said electrodes limits the wavelengths of light permitted to continue on said light path" as recited by Claim 1. Specifically, Negishi, teaches neither a "color modulator comprised of . . . at least three transparent electrodes" nor a "color modulator . . . wherein a voltage applied to said electrodes limits the wavelengths of light permitted to continue on said light path" as recited by Claim 1.

The applicant has not found, and the Examiner has not pointed to, any teaching in Negishi that shows, teaches, or suggests any modulator that uses more than two electrodes.

The Examiner has stated, "The PML in turn is formed of light modulating substance by which light status can be changed according to the strength of electric field. See col. 2, lines 10-28." The applicant respectfully submits the passage cited by the Examiner does not show, teach, or suggest a "color modulator . . . wherein a voltage applied to said electrodes limits the wavelengths of light permitted to continue on said light path" as recited by Claim 1. To the contrary, the passage cited by the Examiner and shown in Figures 1 and 2 of Negishi expressly shows three light sources (REAr, REAg, REAb) each generating a primary color band. The PML modulates the light, but the Examiner has not pointed to any teaching in Negishi that shows, teaches, or suggests the PML "limits the wavelengths of light permitted to continue on said light path" based on a voltage applied to the electrodes.

The Examiner stated, "Furthermore, Negishi teaches about a signal processing circuit (2) outputting a control signal which in turn is related to a drive circuit that is

responsible for color switching and selecting operations. See column 30, lines 14-23 and Fig. 36." The applicant respectfully submits the Examiner has not addressed the limitations of Claim 1. The passage cited by the Examiner does not show, teach, or suggest "a color modulator . . . wherein a voltage applied to said electrodes limits the wavelengths of light permitted to continue on said light path" as recited by Claim 1. To the contrary, the passage cited by the Examiner teaches, as summarized by Negishi in column 31, lines 26-30, "when the switch SW is turned on, the S-polarized light of red wave length band and the P-polarized light of blue wave length bend [sic] can be emitted. Further, when the switch SW is turned off, the S-polarized light of blue wave length band and the P-polarized light of red wave length band can be emitted." Thus, the voltage applied to the electrodes merely selects a polarization, not a wavelength.

The Examiner stated, "Negishi teaches a mixture of light to a substrate (BP2) side of the [spatial] light modulation element SLM beta through the color resolving filter Fdf. See column 44, lines 20-30 and Fig. 23-26." The applicant respectfully submits the passage cited by the Examiner does not address the limitations of Claim 1, and does not show, teach, or suggest "a color modulator . . . wherein a voltage applied to said electrodes limits the wavelengths of light permitted to continue on said light path" as recited by Claim 1. The color resolving filters referred to are dichroic filters that do not select wavelengths of light based on a voltage applied to the electrodes.

For the reasons given above, the Examiner has not met the burden of presenting a prima facie case of obviousness and the rejection of Claim 1 under 35 U.S.C. § 103(a) is defective and should be withdrawn.

Claims 2-6 depend from Claim 1 and should be deemed allowable for that reason and on their own merits. For the reasons argued above with respect to Claim 1, the Negishi fails to show, teach, or suggest the limitations of Claim 1, much less the limitations of Claim 1 in combination with the additional limitations of Claims 2-6.

Issue 2:

Claim 7 was rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,486,878 to Negishi et al. (Negishi). The applicant respectfully disagrees and submits the Examiner has failed to present a prima facie case of obviousness under 35 U.S.C. § 103.

The Examiner has not pointed to any teaching in Negishi that suggests "voltages applied to said electrodes are operable to filter an incident white light beam into a light beam of one of three primary colors" as recited by Claim 7.

The Examiner has stated, "The PML in turn is formed of light modulating substance by which light status can be changed according to the strength of electric field. See col. 2, lines 10-28." The applicant respectfully submits the passage cited by the Examiner does not show, teach, or suggest "voltages applied to said electrodes are operable to filter an incident white light beam into a light beam of one of three primary colors" as recited by Claim 7. To the contrary, the passage cited by the Examiner and shown in Figures 1 and 2 of Negishi expressly shows three light sources (REAr, REAg, REAb) each generating a primary color band. The PML modulates the light, but the Examiner has not pointed to any teaching in Negishi that shows, teaches, or suggests the PML filters "an incident white light beam into a light beam of one of three primary colors" based on a voltage applied to the electrodes as recited by Claim 7.

The Examiner stated, "Furthermore, Negishi teaches about a signal processing circuit (2) outputting a control signal which in turn is related to a drive circuit that is responsible for color switching and selecting operations. See column 30, lines 14-23 and Fig. 36." The applicant respectfully submits the Examiner has not addressed the limitations of Claim 7. The passage cited by the Examiner does not show, teach, or suggest "alternating layers of electrodes and dielectric materials, wherein voltages applied to said electrodes are operable to filter an incident white light beam into a light beam of one of three primary colors" as recited by Claim 7. To the contrary, the passage cited by the Examiner teaches, as summarized by Negishi in column 31, lines 26-30, "when the switch SW is turned on, the S-polarized light of red wave length band and the P-polarized light of blue wave length bend [sic] can be emitted. Further, when the switch SW is turned off, the S-polarized light of blue wave length band and the P-polarized light of red wave length band can be emitted." Thus, the voltage applied to the electrodes merely selects a polarization, not a wavelength.

The Examiner stated, "Negishi teaches a mixture of light to a substrate (BP2) side of the [spatial] light modulation element SLM beta through the color resolving filter Fdf. See column 44, lines 20-30 and Fig. 23-26." The applicant respectfully submits the passage cited by the Examiner does not address the limitations of Claim 7, and does not show, teach, or suggest "alternating layers of electrodes and dielectric materials, wherein voltages applied to said electrodes are operable to filter an incident white light beam into a light beam of one of three primary colors" as recited by Claim 7. The color resolving filters referred to are dichroic filters that do not select wavelengths of light based on a voltage applied to the electrodes.

For the reasons given above, the Examiner has not met the burden of presenting a prima facie case of obviousness and the rejection of Claim 7 under 35 U.S.C. § 103(a) is defective and should be withdrawn.

Claims 8 and 9 depend from Claim 7 and should be deemed allowable for that reason and on their own merits. For the reasons argued above with respect to Claim 7, the Negishi fails to show, teach, or suggest the limitations of Claim 7, much less the limitations of Claim 7 in combination with the additional limitations of Claims 8 and 9.

Issue 3:

Claim 10 was rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,486,878 to Negishi et al. (Negishi). The applicant respectfully disagrees and submits the Examiner has failed to present a prima facie case of obviousness under 35 U.S.C. § 103.

The Examiner has not pointed to any teaching in Negishi that suggests "filtering said beam of white light to produce a primary color beam of light, said filtering step performed by passing said beam of white light through a stack of at least two dielectric layers, at least one of said dielectric layers exposed to an electric field, . . . and altering electrical signals biasing said stack of dielectric layers such that said primary color beam of light alternates between three primary colors" as recited by Claim 10.

The Examiner has stated, "The PML in turn is formed of light modulating substance by which light status can be changed according to the strength of electric field. See col. 2, lines 10-28." The applicant respectfully submits the passage cited by the Examiner does not show, teach, or suggest "filtering said beam of white light to produce

a primary color beam of light, said filtering step performed by passing said beam of white light through a stack of at least two dielectric layers, at least one of said dielectric layers exposed to an electric field, . . . and altering electrical signals biasing said stack of dielectric layers such that said primary color beam of light alternates between three primary colors" as recited by Claim 10. To the contrary, the passage cited by the Examiner and shown in Figures 1 and 2 of Negishi expressly shows three light sources (REAr, REAg, REAb) each generating a primary color band. The PML modulates the light, but the Examiner has not pointed to any teaching in Negishi that shows, teaches, or suggests the PML filters "altering electrical signals biasing said stack of dielectric layers such that said primary color beam of light alternates between three primary colors" as recited by Claim 10.

The Examiner stated, "Furthermore, Negishi teaches about a signal processing circuit (2) outputting a control signal which in turn is related to a drive circuit that is responsible for color switching and selecting operations. See column 30, lines 14-23 and Fig. 36." The applicant respectfully submits the Examiner has not addressed the limitations of Claim 10. The passage cited by the Examiner does not show, teach, or suggest "filtering said beam of white light to produce a primary color beam of light, said filtering step performed by passing said beam of white light through a stack of at least two dielectric layers, at least one of said dielectric layers exposed to an electric field . . . and altering electrical signals biasing said stack of dielectric layers such that said primary color beam of light alternates between three primary colors" as recited by Claim 10. To the contrary, the passage cited by the Examiner teaches, as summarized by Negishi in column 31, lines 26-30, "when the switch SW is turned on, the S-polarized light of red

wave length band and the P-polarized light of blue wave length bend [sic] can be emitted. Further, when the switch SW is turned off, the S-polarized light of blue wave length band and the P-polarized light of red wave length band can be emitted." Thus, the voltage applied to the electrodes merely selects a polarization, not a wavelength.

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For the reasons given above, the Examiner has not met the burden of presenting a prima facie case of obviousness and the rejection of Claim 10 under 35 U.S.C. § 103(a) is defective and should be withdrawn.

CONCLUSION

For the foregoing reasons, Appellants respectfully submit that the Examiner's final rejection of Claims 1-10 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,486,878 to Negishi et al. is improper, and it is respectfully requested that the Board of Patent Appeals and Interferences so find and reverse the Examiner's rejection.

Please charge any fees necessary in connection with the filing of this paper, including any necessary extension of time fees, to Deposit Account No. 20-0668 of Texas Instruments Incorporated.

Respectfully submitted,

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APPENDIX

1. A color display system comprising:

a light source for providing a beam of white light along a light path;

at least one color modulator on said light path, said color modulator comprised of a stack of at least two dielectric layers and at least three transparent electrodes, wherein a voltage applied to said electrodes limits the wavelengths of light permitted to continue on said light path;

a controller;

a spatial light modulator on said light path, said spatial light modulator operable to selectively modulate incident light in response to signals from said controller; and

projection optics on said light path operable to focus light from said spatial light modulator on an image plane.

2. The display system of Claim 1, further comprising a prism assembly for spatially separating an illumination segment of said light path from a projection segment of said light path, said spatial light modulator located at a junction between said illumination segment and said projection segment.

3. The display system of Claim 2, wherein said color modulator is fabricated on a face of said prism assembly.

4. The display system of Claim 1, wherein said color modulator is fabricated on said spatial light modulator.

5. The display system of Claim 1, wherein said spatial light modulator is a deformable mirror device.

6. The display system of Claim 1, wherein said spatial light modulator is a liquid crystal device.

7. A color modulator comprising:

a substrate;

alternating layers of electrodes and dielectric materials, wherein voltages applied to said electrodes are operable to filter an incident white light beam into a light beam of one of three primary colors.

8. The color modulator of Claim 7, wherein said dielectric material are selected from the group consisting of, $LiNbO_3$, $LiTaO_3$, $NH_4H_2PO_4$, KH_2PO_4, and CdTe.

9. The color modulator of Claim 7, said electrodes formed of Indium Tin Oxide.

10. (amended) A method of creating a full-color image, the method comprising the steps of:

providing a beam of white light;

filtering said beam of white light to produce a primary color beam of light, said filtering step performed by passing said beam of white light through a stack of at least two dielectric layers, at least one of said dielectric layers exposed to an electric field;

selectively modulating portions of said primary color beam of light to produce an image-bearing beam of light; and

focusing said image-bearing beam of light on an image plane; and

altering electrical signals biasing said stack of dielectric layers such that said primary color beam of light alternates between three primary colors.